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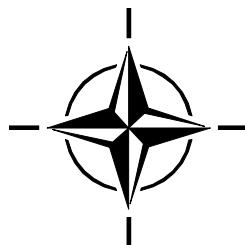
RTO MEETING PROCEEDINGS

MP-MSG-060

## How is Modelling and Simulation Meeting the Defence Challenges out to 2015?

(Comment la modélisation et la simulation répondent-elles aux  
défis de la Défense jusqu'en 2015 ?)

Papers presented at the NATO RTO Modelling and Simulation Group Conference  
held in Vancouver, British Columbia, Canada on 7 and 8 October 2008.



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# The Research and Technology Organisation (RTO) of NATO

RTO is the single focus in NATO for Defence Research and Technology activities. Its mission is to conduct and promote co-operative research and information exchange. The objective is to support the development and effective use of national defence research and technology and to meet the military needs of the Alliance, to maintain a technological lead, and to provide advice to NATO and national decision makers. The RTO performs its mission with the support of an extensive network of national experts. It also ensures effective co-ordination with other NATO bodies involved in R&T activities.

RTO reports both to the Military Committee of NATO and to the Conference of National Armament Directors. It comprises a Research and Technology Board (RTB) as the highest level of national representation and the Research and Technology Agency (RTA), a dedicated staff with its headquarters in Neuilly, near Paris, France. In order to facilitate contacts with the military users and other NATO activities, a small part of the RTA staff is located in NATO Headquarters in Brussels. The Brussels staff also co-ordinates RTO's co-operation with nations in Middle and Eastern Europe, to which RTO attaches particular importance especially as working together in the field of research is one of the more promising areas of co-operation.

The total spectrum of R&T activities is covered by the following 7 bodies:

- AVT Applied Vehicle Technology Panel
- HFM Human Factors and Medicine Panel
- IST Information Systems Technology Panel
- NMSG NATO Modelling and Simulation Group
- SAS System Analysis and Studies Panel
- SCI Systems Concepts and Integration Panel
- SET Sensors and Electronics Technology Panel

These bodies are made up of national representatives as well as generally recognised 'world class' scientists. They also provide a communication link to military users and other NATO bodies. RTO's scientific and technological work is carried out by Technical Teams, created for specific activities and with a specific duration. Such Technical Teams can organise workshops, symposia, field trials, lecture series and training courses. An important function of these Technical Teams is to ensure the continuity of the expert networks.

RTO builds upon earlier co-operation in defence research and technology as set-up under the Advisory Group for Aerospace Research and Development (AGARD) and the Defence Research Group (DRG). AGARD and the DRG share common roots in that they were both established at the initiative of Dr Theodore von Kármán, a leading aerospace scientist, who early on recognised the importance of scientific support for the Allied Armed Forces. RTO is capitalising on these common roots in order to provide the Alliance and the NATO nations with a strong scientific and technological basis that will guarantee a solid base for the future.

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# How is Modelling and Simulation Meeting the Defence Challenges out to 2015?

## (RTO-MP-MSG-060)

### Executive Summary

The importance of Modelling and Simulation (M&S) and its impact on training, experimentation and analysis in NATO and Nations is well recognised and continues to grow. The 2008 M&S Symposium addressed the question “How is Modelling and Simulation meeting the Defence Challenges out to 2015?” The answer derived from papers, presentations, and discussions can be summarized as follows: NATO and the Nations have a strong engineering foundation. M&S applications are broadly utilized and standard based infrastructures have been established. However, the conceptual basis for M&S applications is shifting with the new tasks and operations the armed forces are challenged with. In particular the continuous shift towards command and control for multinational military civilian interagency operations requires a new level of conceptual agility and technical adaptivity. The papers presented during this symposium contributed to understanding the state-of-the-art applications, leading-edge research efforts, and conceptual contributions supporting the conclusion that NATO is willing and capable to face this new and complex challenge.

During this two-day conference, 24 papers were presented in seven sessions. The sessions grouped NATO and national contributions into categories of common topics, including technical challenges – such as research on federation design, interoperability between M&S and C2 systems, and new technologies – and conceptual challenges – such as M&S support for future coalition operations, homeland security, and training. Contributions came not only from the Nations, but several task groups of NMSG used the opportunity to present their findings and recommendations in papers. A common trend was the increase of cooperation with other professional M&S organizations, such as the Simulation Interoperability Standards Organization (SISO), the Interservice/Industry Training, Simulation and Education Conference (I/ITSEC), the Command and Control Research and Technology Symposium (CCRTS), and more.

The alignment of technical and procedural requirements rooted in common standards enables a new quality for collaboration within NATO and partners. The alignment of conceptual requirements and identification to address the conceptual orchestration of the tools provided by NATO and the Nations builds a new challenge that needs to be addressed in the future by NMSG. While interoperability between simulations based on technical standards is well understood, composability of models based on conceptual agreements is still a topic of emerging research. The necessity to collaborate with research centres of industry and academia has been recognized and the references used in the papers show that contacts have been established.

In summary, the keynotes and papers presented during the conference give a good overview of current capabilities and ongoing efforts of NATO, its Nations and its partners and how where additional R&D is needed. M&S does not yet meet all defence challenges, but the foundation is solid and open gaps are started to be addressed.

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# Comment la modélisation et la simulation répondent-elles aux défis de la Défense jusqu'en 2015 ?

## (RTO-MP-MSG-060)

### Synthèse

L'importance de la modélisation et de la simulation (M&S) et leur impact sur la formation, l'expérimentation et l'analyse au sein de l'OTAN et des Nations sont bien connus et ne cessent de croître. Le Symposium M&S 2008 était consacré à la question suivante : « Comment la modélisation et la simulation répondent-elles aux défis de la Défense jusqu'en 2015 ? ». La réponse obtenue à l'issue des exposés, présentations et débats peut se résumer ainsi : l'OTAN et les Nations disposent de bases solides en matière d'ingénierie. Les applications M&S sont largement utilisées et des infrastructures normalisées ont été mises en place. Toutefois, la base conceptuelle des applications M&S évolue avec les nouvelles missions et opérations auxquelles les forces armées sont confrontées. Plus particulièrement, l'évolution constante vers le commandement et le contrôle pour les opérations inter-agences civiles et militaires multinationales nécessite un nouveau degré d'agilité conceptuelle et d'adaptivité technique. Les communications présentées lors de ce symposium ont permis d'appréhender les efforts de recherche et les applications de pointe, ainsi que les contributions conceptuelles appuyant la conclusion selon laquelle l'OTAN a la volonté et les moyens de relever ce nouveau défi complexe.

Au cours de cette conférence de deux jours, 24 exposés furent présentés, répartis en sept sessions. Les sessions ont regroupé les contributions nationales et de l'OTAN en catégories de thèmes communs, notamment les défis techniques – recherches sur la conception de la fédération, interopérabilité entre systèmes C2 et M&S, nouvelles technologies – et les défis conceptuels – soutien M&S pour les futures opérations de la coalition, sécurité intérieure, formation. Les contributions ne provenaient pas uniquement des Nations : plusieurs groupes de travail du Groupe OTAN sur la modélisation et la simulation (NMSG) profitèrent de l'occasion pour exposer leurs conclusions et leurs recommandations. L'augmentation de la coopération avec les autres organisations M&S professionnelles – l'Organisation de normalisation de l'interopérabilité en matière de simulation (SISO), le salon de la formation, de la simulation et de l'entraînement interservices/interindustrie (I/ITSEC), le Symposium sur la recherche et la technologie en matière de commandement et de contrôle (CCRTS), entre autres – se révéla être une tendance commune.

L'alignement des exigences techniques et procédurales intégrées dans des normes communes permet une nouvelle qualité de collaboration au sein de l'OTAN et de ses partenaires. L'alignement de l'identification et des exigences conceptuelles en vue de maîtriser l'orchestration conceptuelle des outils fournis par l'OTAN et les Nations génère un nouveau défi qui devra être relevé par le NMSG dans le futur. L'interopérabilité entre les simulations basées sur des normes techniques est bien appréhendée, mais la composabilité des modèles basés sur des conventions conceptuelles demeure un sujet de recherche émergent. La nécessité de collaborer avec les centres de recherche de l'industrie et des universités a été reconnue et les références citées dans les exposés démontrent que des contacts ont été établis.

En résumé, les allocutions et les exposés présentés au cours de cette conférence offrent une bonne vue d'ensemble des capacités actuelles et des efforts continus de l'OTAN, de ses Nations et de ses partenaires et révèlent les domaines dans lesquels la recherche et le développement doivent être poursuivis. La M&S ne répond pas encore à l'ensemble des défis de la Défense, mais les bases sont solides et les failles commencent à être traitées.

# REPORT DOCUMENTATION PAGE

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